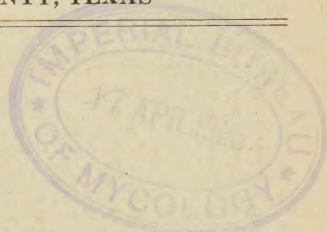


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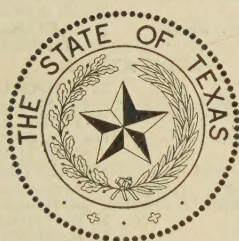
# TEXAS AGRICULTURAL EXPERIMENT STATION

B. YOUNGBLOOD, DIRECTOR  
COLLEGE STATION, BRAZOS COUNTY, TEXAS

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## THIRTY-SEVENTH ANNUAL REPORT 1924



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AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS

T. O. WALTON, President

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F. A. BUECHEL, Ph. D., *Professor of Agri-*  
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G. P. GROUT, M. S., *Professor of Dairy*  
*Husbandry*

V. P. LEE, Ph. D., *Professor of Agricul-*  
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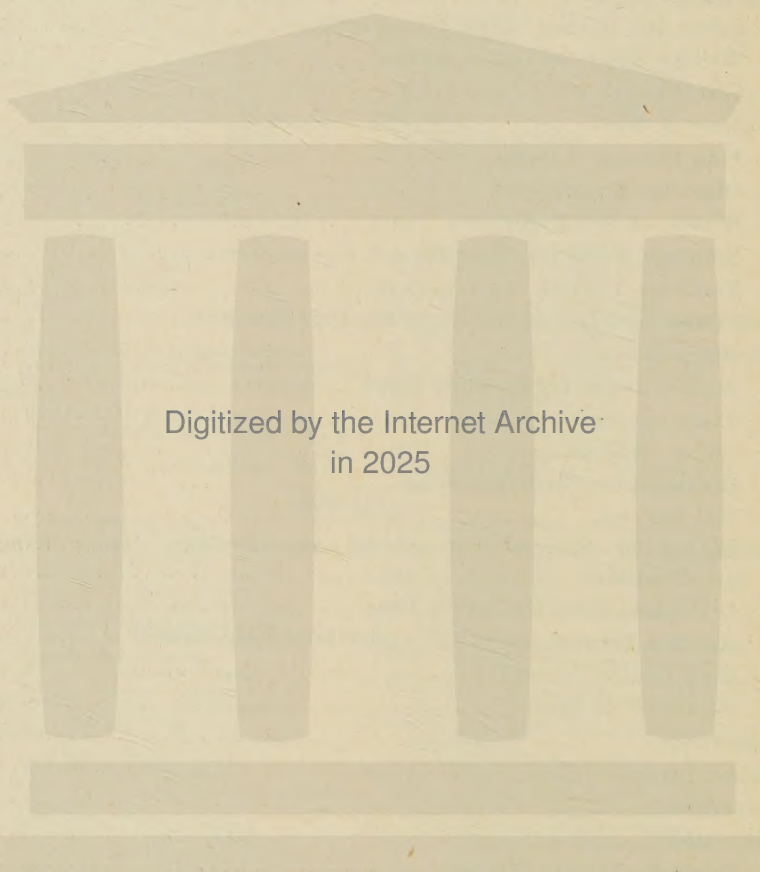
\*Dean, School of Veterinary Medicine.

\*\*In cooperation with U. S. Department of Agriculture.



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# THIRTY-SEVENTH ANNUAL REPORT 1924

B. Youngblood, Director

## INTRODUCTION

The Thirty-seventh Annual Report of the Texas Agricultural Experiment Station System, Agricultural and Mechanical College of Texas, which follows is for the fiscal year beginning September 1, 1923, and ending August 31, 1924.

The Texas Station System comprises a Main Station at College Station, consisting of 12 separate divisions of work with the necessary offices and appropriate laboratories for scientific research, and 15 substations, or experiment farms, located in as many agricultural regions of the State. In addition, there is the Main Station Farm at College Station; the State Apicultural Research Laboratory near San Antonio; a queen-rearing yard also near San Antonio; and three research bee outyards located at Dilley, Roxton, and Seguin; and the Loin Disease Research Field Laboratory, near Bammel, in Harris County.

## NEW UNITS

### Lower Rio Grande Valley Citrus Station

During the past ten years there has been a rather insistent demand on the part of the people of the Lower Rio Grande Valley for the establishment of an agricultural experiment station which would study the problems of the Valley, giving emphasis to the solution of citrus problems.

In response to this demand on the part of the people, the Thirty-eighth Legislature passed an Act providing for the establishment of such a station by the Board of Directors of the Agricultural and Mechanical College of Texas, and appropriating \$50,000.00 for this purpose.

After careful scientific investigation of agricultural conditions in the Valley by specialists, the Board of Directors located the Lower Rio Grande Valley Citrus Experiment Station two miles east of Weslaco, in Hidalgo County. The tract consists of 100 acres of Victoria Fine Sandy Loam, and is ideal for the purposes of an experiment station. It has a 10-acre growing orchard of Marsh Seedless grapefruit comprising one thousand trees, now five years old and in excellent bearing condition.

Although the Station was formally established in October, it was not until March that an acceptable deed to the land could be obtained, and for that reason it was not possible to begin work in time to produce satisfactory crops during 1924. The first undertaking was to provide frost protection for the grapefruit orchard. Clearing, grubbing, and leveling of the land followed rapidly, so that by the end of the year all the land except 35 acres produced some kind of a crop. It will be some time, however, before the entire tract can be placed in proper condition for irrigation, be-



cause of the expense involved. Permanent buildings are being planned and will be erected during the coming year. The land is being laid out in acre-blocks and the necessary irrigation and drainage ditches and borders are being put in.

Though this land had formerly been sold at a price of \$425.00 per acre, the State made an offer of not exceeding \$100.00 per acre for the raw land, and \$800.00 per acre for the 10 acres containing 1000 five-year-old bearing trees of Marsh Seedless grapefruit, or a total of \$17,000.00 for the 100-acre tract desired as a site for the Station. This the people of the Valley accepted, and the difference in the price was made up by local citizens, including the American Rio Grande Land and Irrigation Company and citizens of Mercedes and Weslaco communities.

The remainder of the appropriation, \$33,000.00, is being devoted to properly equipping the Station with houses, barns, laboratories, and sheds, and in otherwise developing the property. By virtue of this adequate appropriation, this Station has been more promptly developed to a point of usefulness than any other Station ever established in Texas, and this is of importance to Texas not only because the Station will promptly proceed to a systematic study of the farmer's problems in the Valley, but also because of the good-will which will result from its beginning to render direct service to the farmers of the Valley without years of waiting for equipment and maintenance.

### Wichita Valley Irrigation Station

During the past five years a repeated request has been made by the people of Wichita County and adjoining territory for the establishment of an irrigation experiment station within the area served by the new Wichita Valley irrigation project. The matter was presented to the Legislature, however, rather late in the last called session, and only \$4,650.00 per annum was provided for the Station's establishment. The people promised to donate the land and water. With the limited appropriation, the Board of Directors of the Agricultural and Mechanical College of Texas has accepted the liberal donation of 161.795 acres of fine irrigable land, for the purchase of which the people of Wichita Falls and Iowa Park raised a fund of \$12,000.00 in cash. Although the site was selected and the land acquired during the fiscal year 1923-24, formal establishment of the Wichita Valley Irrigation Experiment Station (Substation No. 16) dates from September 1, 1924, in accordance with resolution of the Board of Directors of the Agricultural and Mechanical College of Texas.

The people of these communities not only fulfilled every promise made to the Legislature and to this institution, but did a great deal more than this. In order to make the Station easily accessible, the county has spent some \$20,000.00 grading and permanently paving a 60-foot highway from the great concrete turnpike, running northwest and southeast through the county and passing through the towns of Wichita Falls and Iowa Park, to the Station. The State should appreciate the hearty cooperation on the part of the citizens of Wichita County and provide adequately for the

equipment of this Station on a basis comparable with the Lower Rio Grande Valley Citrus Experiment Station and other stations elsewhere in this State.

The Wichita Valley Irrigation Experiment Station will study questions pertaining to the breeding and selection of fruits, vegetables, field crops of that district, soil management, fertilizers, insect pests, plant diseases, and the time and amounts of water to apply to different crops, and related problems.

### Loin Disease Field Laboratory

For some years past the ranchmen of South Texas have sustained rather heavy losses of cattle due to an unknown disease locally referred to as "Loin Disease."

During the sessions of the Thirty-eighth Legislature, the citizens of this district and ranchmen concerned presented this problem to the Finance and the Appropriations Committees of the House and Senate, and secured an appropriation for the establishment of a loin disease laboratory and its maintenance during the present biennium.

In accordance with this appropriation, the Board of Directors of the Agricultural and Mechanical College, acting under the provisions of the Experiment Station Law, approved the location of this laboratory on a leased tract of land comprising 879.4 acres, and located about 15 miles north of Houston near Bammel, in the heart of the affected territory.

The money was made available in the form of a larger appropriation for the Division of Veterinary Science, in order that this laboratory might be put in. Then, the County Commissioners Court of Harris County has cooperated with the Station, furnishing \$1,500.00 to be expended for buildings on the ranch and for other improvements.

## PROGRESS OF WORK

### Loin Disease of Cattle

Bulletin No. 319 describes a disease of cattle which manifests itself by a sudden and complete breakdown of the animal's organs of locomotion, which is locally called "Loin Disease" or "down-in-the-back."

This disease is prevalent from May to September in the low flat area bordering on the Gulf of Mexico and affects cattle over 18 months of age in case such cattle have been subsisting entirely on the native vegetation for a period of at least one year. It is not observed in dairy cattle fed on a dairy ration.

The outbreaks of the disease simulate an infectious disease, but in repeated experiments pathogenic organisms could not be demonstrated.

The cause of the disease is tentatively ascribed to toxins produced by bacterial action in carcass material on the prairie and the consumption of such putrid material by cattle.

It is tentatively recommended to feed sweet bone-meal to cattle in



order to stop them from eating dangerous carcass material; also to thoroughly clean all pastures of animal carcasses.

Investigation of this disease is not yet complete and experiments are under way to definitely prove whether putrid carcass material is the sole source of the toxin and to establish the best methods of preventing the disease.

If no other than the toxic cause of loin disease exists, the results obtained in our experiments indicate that the logical procedure to stop the losses from this disease would be to check the bone-craving habit of the animals on the range. Feeding the animals sweet bone-meal in sufficient amounts to supply the deficiency necessary for the upkeep and normal development of the body should stop the disease in all cases. Scrupulously cleaning the range of all carcasses and carcass material, not only of cattle, but also of all other animals, should have a tendency to decidedly check, if not entirely prevent losses, depending upon the degree of thoroughness with which the cleaning is carried out.

During the year, Sir Arnold Theiler, Director of Veterinary Education and Research for the Union of South Africa, visited Texas and while at College Station saw some of the data secured in our investigations of loin disease. Doctor Theiler expressed the opinion that this trouble is identical with lamziekte, a disease very prevalent in South Africa and upon which he has worked for several years. He stated that this disease is contracted by the animals when eating putrid bones on the range; that he had been able to reproduce the disease by feeding such bones to animals, but had failed to produce it in any other way. He states that the bone-craving, in turn, is due to a lack of phosphorus in the soil and vegetation. Since lamziekte is contracted by eating bones, it only remained to stop the animals from doing this in order to prevent the disease. This was successfully accomplished by feeding the animals three ounces of sweet bone-meal daily all the year round. In order to prove his contention, Doctor Theiler administered this quantity of bone-meal to each individual animal daily with the result that a large number of animals thus fed, all stopped the habit of chewing bones in the pasture and none contracted the disease, while the control animals, which had not received the bone-meal and were otherwise kept under like conditions, continued the habit of chewing bones and all developed the disease.

Not only did he stop the disease by this method, but he was also able to show that the animals receiving the bone-meal for some time before they reached maturity, made a much better growth and in the end developed into much better animals, weighing several hundred pounds more than the control animals which did not receive bone-meal. Doctor Theiler suggested that bone-meal be mixed with stock salt at the rate of two pounds of bone-meal to one pound of stock salt and placed in troughs in the pasture near watering places so that all animals may have easy access to them at all times. A sufficient number of troughs should be provided so as to prevent the stronger animals from hooking away the weaker ones.

While working on this trouble Doctor Theiler also found that another



disease of South Africa, known there as styfziekte, a disease probably identical with "creeps", could be prevented in the same way.

Considering, then, Doctor Theiler's description of lamziekte, one must observe that the symptoms of this disease and loin disease are very similar, if not identical. It has, however, not yet been shown experimentally that the two diseases have a common cause. The organism responsible for the production of the loin disease toxin has not even been cultivated, up to the present.

The Division of Veterinary Science has projected a number of experiments which will likely throw some more light on the subject and also indicate the best method of feeding bone-meal to cattle.

Soon after the establishment of the loin disease field laboratory, 88 cows and 24 calves were placed in the pastures, in three different lots. Pastures No. 2 and 3 received 24 head each, while No. 4 received 40 head. Half of the cows in Pasture 4 were placed on a mixture of bone-meal and salt, consisting of one part of salt to two parts of bone-meal, mixed on the ranch, and six pounds of the mixture was allotted to the cows each day. Half of the cows in Pasture 3, consisting of all the cows with calves, were placed on bone-meal alone, with a daily allotment of three ounces per head. One-half of the cows in Pasture 2 were placed on finely ground rock phosphate, with the view of allowing each animal three ounces a day. Once a week all the cows were tested for the habit of chewing bones, by placing before them weathered bones picked up on the prairie, or sweet bleached bones, in order to note the effect of bone-meal consumption on this habit. The surprising result of the bone-craving tests was that 64 out of 86 cows (two had died in the meantime), either chewed or munched bones, wood, cardboard, rocks, ropes, or other objects.

Finely ground rock phosphate was furnished the cows in Pasture 2 in an effort to determine whether this substance could be substituted for bone-meal. Because the cows entirely ignored the rock phosphate, after four days a mixture of three parts of rock phosphate and one part of salt was offered them. The animals, however, also ignored this mixture, so that the mixture was again changed to equal parts rock phosphate and salt. The amount of the mixture consumed by the cattle was negligible, so that it was decided to add still more salt. Accordingly the mixture was changed to rock phosphate one part and salt two parts. For two weeks thereafter the amount consumed by the cows was so small that it was decided to attempt other means of getting the animals to eat it. The mixture was, therefore, placed in boxes with cottonseed meal sprinkled over the top, so as to form a thin layer of meal on top. The result was surprising, as all animals consumed some of the mixture on the first day this plan was tried, though it could be seen that the cows did not relish the mixture. This method was followed for the rest of the summer, however, and it was found that the 12 cows came to consume almost a pound of the mixture daily.

The cows in Pasture 3, on bone-meal alone, ate so little of the meal that it was considered wise to change the allotment to a mixture of bone-meal and salt, after a trial of 30 days. Accordingly, a mixture of three parts

bone-meal and two parts salt was provided and three ounces of the mixture per animal per day was placed in the pasture. Though the mixture seemed to be relished, not enough of it was consumed to provide satisfactory results.

Much better results were secured with the cows in Pasture 4, where the animals received a mixture of two parts bone-meal and one part salt. With the exception of three cows, one of which had an entirely negative record, one almost a negative record, and one was a very poor eater, all the cows in this pasture ate their full share of the mixture each day.

The effect of feeding various mixtures of bone-meal and salt and of rock phosphate and salt to cows to control the habit of craving putrid bone, may be summarized as follows:

No effect whatever could be noted in Pasture 2, as a result of feeding the rock phosphate and salt mixture, though it was not possible to get the animals to eat the mixture satisfactorily except for the last two weeks of the test.

Pasture 3, containing cows with nursing calves, gave slightly more encouraging results. This lot, at the outset, was placed on bone-meal alone, and changed to three parts of bone-meal and two parts of salt. Of seven "bone cravers", only two have consistently consumed a satisfactory amount of the mixture, and both of these animals have discontinued their craving for putrid bones. Others, however, still have the craving. Out of these seven "bone cravers", two animals suffered attacks of loin disease during the experiment. One animal, after having been down for three days, was killed, while the other animal, having a mild attack, fully recovered. Because of the fact that all the cows in Pasture 3 had nursing calves, they were rather thin in flesh, and some of them became so thin that it was necessary to feed them on cottonseed meal, and thus, out of the 23 cows in the lot, nine received cottonseed meal at one time or another during the experiment. It should be noted, however, that the two cows in this pasture which have good bone-meal consumption records have put on flesh and are now in a much better condition than those animals which have consumed only small amounts of the bone-meal.

The most satisfactory results with reference to the effect of the bone-meal on the bone-craving habit of the animals were secured in Pasture 4. There were 40 cows in this pasture, which were divided into two lots of 20 each before anything was known of their "bone-craving" inclinations. It later developed that 16 out of 18 in one of these lots (two animals had died from another disease) were "bone-cravers", while 10 of the 20 animals on the bone-meal and salt mixture chewed bones at one time or another. Of these 10 latter animals, six have stopped chewing bones, one has consistently refused to eat the bone-meal and salt mixture, one has an almost negative record, one is a very poor eater, and one is a questionable bone-craver, having only once been observed to chew a tiny piece of bone. The condition of all animals in this lot which have a good bone-meal consumption record is strikingly better than that of the control animals or that of the delicate eaters.



While these experiments were being carried out at the loin disease field laboratory, work was also being continued in the main laboratory at College Station, with a view of growing the organism responsible for the disease, if indeed there is any. Accordingly, bones were collected from the prairies, from animals having died of loin disease, and these were ground up in a bone grinder. In a few cases dried flesh was still clinging to these bones, or dried hide was used. These ground substances were placed in culture media, liver bouillon, which permitted both aerobic and anaerobic growth. After incubation for three or four days at 100 degrees centigrade, growth was permitted to continue at room temperature for three to ten days longer, when the liquid portion was poured off and cows were drenched with it. During the year 39 cows were drenched in this manner, all with negative results.

The ground bone from which the foregoing samples were taken was then fed direct to four steers, mixed with wheat bran and corn chops. Steers No. 2 and 4 were placed on this mixture on January 31, and Steers 1 and 3 were placed on experiment on February 7. The four steers consumed 436 pounds of this putrid ground bone, all that was available, divided as follows: Steer 1, 95 pounds; No. 2, 119 pounds; No. 3, 97 pounds; No. 4, 125 pounds. The consumption of this ground bone was at first irregular and the amount variable, but after May 3, each steer regularly ate about two pounds a day. Steer No. 2, eating 119 pounds of the material in 124 days, came down on June 4 with a typical case of loin disease. The animal was carefully nursed and on June 27, 23 days after being stricken, was able to rise again when assisted, and recovered. On June 5 the supply of bone was exhausted, when the tests were suspended.

### Digestion Experiments

Bulletin No. 315 contains a report of digestion experiments with 12 feeds, conducted for the purpose of securing information regarding their feeding values as shown by their productive values and digestible protein. The feeds studied are alfalfa meal, corn cobs, cottonseed meal, cottonseed hulls, kafir head stems, live-oak leaves, mesquite beans, oats, oat hull clippings, oatmeal by-products, rice bran, and rice polish. The composition, coefficients of digestibility, digestive protein, productive value, and production coefficients are given for the samples studied. This is a progress report, so that detailed discussion of the feeds is left for a later bulletin.

### Studies of Soil Types

The chemical composition, fertility, and means of maintaining soil fertility of the various soils found in Brazos, Camp, Ellis, and Washington Counties are discussed in Bulletin No. 316. Studies were made of 29 soil types from Brazos County; 6 from Camp; 12 from Ellis; and 8 from Washington County. Pot experiments were made on a number of soil samples. The upland soils of Ellis and Washington Counties were found to be richer than those of Brazos and Camp Counties. The soils of Camp County responded especially well to fertilizers containing phosphoric acid and nitrogen.

### Standard Fertilizer Formulas

A very important accomplishment during the year was the aid given by the Division of Chemistry in the adoption of 11 standard high-grade fertilizer formulas for use in Texas, Arkansas, and Louisiana, and the publication of recommendations for their use in Circular No. 31. The standard formulas help the farmer to get his fertilizer at a lower cost for each unit of plant food, aid in the more intelligent use of fertilizers, and have many other advantages. The sale of the standard formulas amounted to 12,000 tons, a very gratifying showing considering the fact that they had been prepared such a short time before. At a moderate estimate, there was a saving of five dollars a ton on fertilizers prepared under these formulas, or a total saving to the farmers of \$60,000. The use of the standard formulas will no doubt increase as time goes on.

### Fertilizer Control

The Chief of the Division of Chemistry is, by law, State Chemist, and as such is in charge of the fertilizer control work of Texas. The fertilizer control work was unusually heavy during the past year, on account of the largest sales of fertilizers yet reported in the State, amounting to 126,200 tons. The number of samples collected was 928, and all of these samples were analyzed.

### Cotton Variety Experiments at the Main Station

Bulletin 321 reports the results of experiments with varieties of cotton at the Main Station, College Station, for the years 1912 to 1922, inclusive. Lone Star, Mebane, and Rowden were the only varieties occurring in the test every year. The average yields of lint to the acre of these varieties for the period were: Lone Star, 231 pounds; Mebane, 225 pounds; and Rowden, 224 pounds. Lone Star also ranked first for the five years 1912, 1914, 1917, 1918, and 1919, and also for the 10 years 1912-1922, exclusive of 1915, with an average yield of 183 and 230 pounds of lint respectively. Mebane made the highest average yield during the seven years, 1912 to 1918 inclusive; ranked second in two five-year periods, and third for the ten years, 1912 to 1922, omitting 1915. Truitt ranked first for the seven years 1912, 1913, 1914, 1919, 1920, 1921, and 1922, while Rowden, Lone Star, Durango, and Mebane ranked next in the order named. Belton produced the highest average yield for the four years, 1919 to 1922 inclusive; Truitt, Acala, Lone Star, and Rowden followed in the order named. This bulletin shows that high yield is correlated with well distributed rainfall in June, July, and August. No correlation, however, was found between yield and total rainfall for the year. There was no significant correlation between yield of lint to the acre and percentage of lint. The results show that the percentage of lint or gin turn-out is not very important in comparing varieties to determine the variety the farmer should grow. In selecting a variety the farmer should consider, first, yield of lint to the acre; second, length of staple; third, quality of lint; and fourth, the percentage of lint.



### Berry Breeding

Breeding work with dewberries and raspberries, undertaken in 1907 and followed continuously since, has developed several promising hybrids. Among these is the Nessberry, a raspberry-dewberry combination, named after its originator, Professor Helge Ness. Several thousand plants of the Nessberry have been distributed. The tests during the year permitted the selection of another strain, also a hybrid, but of a different combination from the Nessberry. The results of the berry breeding work are now being edited for publication and will probably be published during the coming year.

### Studies of the Indian Cling Peach

In 1911 studies were begun of the longevity, adaptability, and other qualities of the old-fashioned Indian Cling peach as compared with commercial varieties of peaches. Owing to the poor soil on which the orchard was located, however, the trees are in poor condition and no peaches have been produced during the past several years, though one desirable variety has been propagated from the orchard.

### Fruit Adaptation

In the study of the adaptation of fruits introduced into the United States, in cooperation with the Office of Foreign Seed and Plant Introduction of the United States Department of Agriculture, very few trees now under observation show promise of being adapted to the locality of College Station, although there are now about 250 plants of various kinds in orchard form. The jujubes have fruited heavily, and one variety, S. P. I. No. 36854, has been found to be of high quality. The adaptability of the jujube to this locality, and the entire State, has already been proved. The Methley plum, S. P. I. No. 31652, has been found productive and will be increased and kept under observation.

During the year, 300 rooted cuttings of the Meyer lemon were received from Washington. Of these, 25 were planted at Beeville; 25 at Angleton; and 225 at The Rio Grande Valley Station near Weslaco. All of them have grown off nicely and give promise of being adapted.

### Citrus Studies

The citrus fruit orchards at Beeville consist of three different plantings. The south four rows of the east orchard were planted in 1905 and contain Satsumas, several varieties of pomeloes, and two varieties of qumquats. The 10 rows north of these, planted in 1910, consist of round oranges, pomeloes, lemons, and citranges. The west orchard was planted in 1907 and contains oranges, pomeloes, lemons, and limes.

Beginning in 1914, individual tree-yield records were kept, and certain Satsumas have shown very satisfactory records. The other varieties were not profitable during this period, though the winters of 1916, 1917, and 1918 were very severe. The high yielding trees are being utilized for the pro-

pagation of buds. So far as is known, this is the most complete tree-yield record of the Satsuma available in this country.

### Horticultural Farm Relocated

Owing to the fact that the soil was unsuited for orchard and nursery work, it has been found necessary to remove the field work of the Division of Horticulture from the location on the Main Station Farm. Accordingly, a suitable site was selected on College land, about two miles from the campus, and the move was made and the first plantings made on the new site in the spring of 1924. Development of the new site has included the construction of a foreman's cottage, a barn, and the sinking and equipping of a well for water supply. Further developments will be made in 1925.

### Soil Surveys

The Division of Soil Survey, conducted in cooperation with the Bureau of Soils of the United States Department of Agriculture, has continued its task of gradually surveying the soils of Texas by counties. During the year a detailed soil survey was made of Wichita County, and in cooperation with local citizens a complete detailed soil survey was made of the area served by the Wichita Valley irrigation project. Early in 1923, a soil survey of Hidalgo County was begun and this survey will likely be completed during 1925. Because of the recent location of the Lower Rio Grande Valley Citrus Experiment Station (Substation No. 15) in Hidalgo County, this survey will be valuable, not only to the citizens concerned, but also to the Station System.

The detailed survey of Nacogdoches County, begun in 1923, will also be completed during 1925. The detailed soil survey of that county will be especially valuable, since Substation No. 11, near Nacogdoches, has for a number of years been getting satisfactory results from fertilizers and crop rotations on the Orangeburg soils of that area.

A detailed soil survey of Milam County started in the spring of 1924, is progressing satisfactorily, and it is hoped that it may also be completed in 1925.

During the year, the soil surveyors have surveyed approximately two thousand square miles. This has been made possible largely by the speeding up of the work with a small personnel, through the plan worked out by the Station of using Ford cars for the soil surveyors in getting around over the areas being surveyed. The efficient use of Ford cars in this connection has been made possible by the perfection of distance-measuring devices for attaching to the cars, by the soil survey specialists of the Station.

### Studies of Fleeces Produced by Angora Goats Under Range Conditions

A comprehensive study of the weights of fleeces produced by nearly 1200 different Angora goats, kept under range conditions on the Ranch Experiment Station in Southwestern Texas, is reported upon in detail in Bulletin No. 320.

The first part of this bulletin is introductory and describes the goats



and the conditions under which they were kept, and defines the words which are used with a special meaning in this bulletin.

The second part of this bulletin is concerned with the constancy of the individual fleece weights from one shearing to another. Upon this constancy depends the success of methods of culling for increased fleece weight. Fleece weights are found not to be as constant for Angora goats as they were for the sheep reported in Bulletin 311. The average coefficient of correlation between the weights of fleeces produced by the same Angora goats at different shearings was  $+ .415 \pm .008$ . The fall shearing when the goat is a year and a half old is the most reliable time for the culling of goats to increase the average fleece production of the flock.

The third part of this bulletin is concerned with the influence of the age of the goat upon the weight of the fleece it produces, and with the influence of seasonal conditions upon the average weight of fleece produced by the flock. The female goat, like the female sheep, reaches its maximum fleece-production in the second year of its life. Wether goats may produce still heavier fleeces at later ages. The average weight of the fleeces of mohair is more strongly influenced by changes in seasonal conditions than is the average weight of the fleeces of wool. Fall fleeces of mohair are heavier than spring fleeces.

### Cottonseed Meal for Laying Hens

Bulletin No. 317 embodies data secured in the poultry feeding experiments wherein cottonseed meal was used instead of animal products as a source of protein for laying hens. The results warrant the recommendation of freshly ground cottonseed meal as a substitute for meat-scrap and tankage in rations for laying hens.

The ration in which cottonseed meal gave the best results was: wheat bran 125 pounds, wheat gray shorts 75 pounds, corn meal 75 pounds and cottonseed meal 120 pounds.

Data are also given showing that with hens given feeds containing only limited quantities of fat-soluble A for a period of seven months and three weeks, the mortality was very high and the egg production was low. The greatest mortality and the lowest egg production occurred during the last seven weeks of the experiment.

### Relation Between Rents and Agricultural Land Values

Bulletin number 318, "The Relation Between Rents and Agricultural Land Values in Theory and in Practice", gives a detailed discussion of the factors entering into land valuation, the relation of rents to land values in Brazos, Dallas, and Williamson Counties; and the abstract economists' conception of rent. It is pointed out that, in addition to the capitalization of rent, the farm as a home, community development, personal preference, prospects of future rents and interest rates, high-power salesmanship, a system of land credit, and taxation, are factors entering into land valuation.

In studying the relation of rents to land values in Brazos, Dallas, and Williamson Counties the following conclusions were made:

1. There is a close relationship between land value and land rent.
2. Landlords seem to expect a certain rate of return and when rents rise they increase the valuation of their land so as to receive the expected rate of return.
3. The lowest rate of return is almost universally found to be on the best land.
4. The income from land on the cash rent basis seems to be about 2 per cent less than upon the basis of share rent.
5. The variations in the rate of return from the three counties studied are great and seemed to vary directly as the degree of speculative risk.

The last part of the bulletin gives a brief resume of the abstract economists' conception of rent. In this connection, attention is called to the fact that no theory of rent in the modern sense of the term appeared during ancient and mediaeval times. The subject of rent began to attract attention during the regime of the Mercantilists. Its chief exponents were Petty, Locke, and Steuart. The Physiocrats devoted a great deal of time to the subject of rents. The differential theory of rents together with its further refinements and amplifications were developed by such men as Ricardo, Anderson, West, Carey, Mill, Walker, Jevons, Marshall, and Clark.

### Feed Control Service

The Texas pure feed law has been quietly and efficiently enforced by the Division of Feed Control Service during the year, protection being afforded the consumers against adulterated, misbranded, and inferior feeding stuffs. Owing to the rigid enforcement of the law, the consumer has assurance that any feeding stuff bearing the Texas tag is as good, or better than, it is represented to be. This continued policy has put the trade upon an honest basis and practically eliminated dishonest competition. Continuation during the year of the cooperation with the Bureau of Chemistry of the United States Department of Agriculture, under the Food and Drugs Act of 1906, has been of considerable service to the State in handling interstate shipments, which are not covered by the Texas law.

### Foulbrood of Bees

Foulbrood inspection and eradication work has been carried on in 63 counties of the State during the year, and in 26 of these counties American foulbrood was found. Several new disease areas were located during the year, and likewise several old areas were freed of the disease. No European foulbrood was disclosed during the year, though Federal inspectors reported a single case in a North Texas county. Close inspection and observation of the case, however, failed to develop any symptoms of the disease. A total of 38,037 colonies were inspected during the year, of which 411 colonies contained American foulbrood. Of this number of diseased colonies, 14 were treated, and 397 colonies were destroyed immediately. A



total of 887 colonies were found in cross-comb hives, and 169 of these colonies were transferred to new hives during the year. The other 718 colonies will be transferred during 1925. Inspections were made of 41 queen-breeding establishments, and 41 breeder's certificates were issued, and in no case was it necessary to revoke a queen breeder's certificate during the year.

Preliminary tests were made of the alcohol-formaldehyde treatment for combs from foulbrood colonies. While the tests were not final, the indications were that under Texas conditions this treatment is not satisfactory.

### SUBSTATIONS

A considerable number of the activities of the Station System are devoted to the lines of investigation and research conducted on one, several, or all of the 20 locations in various parts of the State where continuous systematic work is under way. These field locations are permanent substations in 15 cases, and had their origin in the fact that field experiments conducted at the Main Station would not yield definite information applicable to every part of the State. Much of the work conducted at these outlying points is original and fundamental research, which, because of climatic or soil factors, cannot be prosecuted at the Main Station. Other work of the substations, however, is devoted to a testing out of the current results produced by the scientific staff of the Station System, in the attempt to make practical use, in each of the several locations, of work which has had its origin in the technical laboratories at the Main Station.

Attention is specifically directed to the fact that these outlying field locations are outdoor laboratories wherein accurate, definite, detailed records of experiments are secured.

Each of the substations carries one or more specific responsibilities in addition to its function as a definite unit for the regional testing out of the findings of the Main Station. The particular lines of work most stressed on each one of the substations are as follows:

Substation No. 1, Beeville: Investigations with hardy citrus fruits and dry-farming agronomic investigations.

Substation No. 2, Troup: East Texas fruit and vegetable crops, together with horticultural and field crop soil fertility investigations.

Substation No. 3, Angleton: Crop production on the Gulf Coast Plain, including studies of forage crops, grasses, legumes and fruits, as well as drainage investigations.

Substation No. 4, Beaumont: Rice and rice farming, together with the supplemental crops, irrigation, drainage, and fruit industries, which must go with rice farming.

Substation No. 5, Temple: Cotton breeding and improvement, cotton diseases, particularly cotton root rot, and all crops needed in a rotation with cotton, as well as fertilizers, drainage and fruit problems for Central Texas.

Substation No. 6, Denton: All crops adapted to the heavy soils of the black prairies, with particular emphasis on small grain, rotation and fertilizers.

Substation No. 7, Spur: The grain and forage sorghums of the broken region east of the High Plains, but including also cotton and other crops, and experiments on the utilization of the locally produced feed crops, including feeding experiments with cattle and sheep.

Substation No. 8, Lubbock: Suitable crops and methods of crop production on the High Plains, including fundamental research in the improvement of sorghums and cotton, together with studies in soil fertility, dry-farming and supplemental irrigation.

Substation No. 9, Balmorhea: Irrigation farming in Southwest Texas.

Substation No. 10, College Station: Studies in the feeding, breeding and management of livestock, with particular reference to those types of work which will have Statewide value.

Substation No. 11, Nacogdoches: The development of a profitable system of crop production and soil management in East Texas, including fertilizer investigations and specific inheritance studies in peanuts.

Substation No. 12, Chillicothe: This is a forage crop testing farm, specifically devoting a large amount of its attention to the trying out and development of new forage crops, but including supplemental work with farm crops and farm practices.

Substation No. 14, Sonora: A study of ranch animal husbandry and ranch management, with sheep, goats, and cattle, as well as studies of veterinary problems related to the livestock industry.

Substation No. 15, the Lower Rio Grande Valley Citrus Fruit Experiment Station, Weslaco: This station is being established primarily for investigations with citrus fruits, including the testing and improving of stock, and the study of methods of controlling insects and diseases common to citrus fruits. A subsidiary line of work deals with studies of vegetable production in all its phases. The growing of both citrus fruits and vegetables will also be considered in connection with general farm crops which are necessary to the best operation of such specialized types of farming.

Substation No. 16, the Wichita Valley Irrigation Experiment Station, Iowa Park: This station was established for the investigation of problems connected with irrigation farming in the Wichita Valley region. These problems embrace the proper uses of water and the suitability of various general farm, truck, and fruit crops for the region.

The Loin Disease Field Laboratory, located on a ranch near Bammel, in Harris County, is for the specific study of loin disease of cattle.

The other outlying laboratories, four in number, are all specifically concerned with fundamental studies relating to the bee and honey industry of Texas, in locations differing essentially in their suitability for certain lines of this work.

## STATION LANDS

The following table shows the lands owned and operated by the Agricultural Experiment Station System of the Agricultural and Mechanical College of Texas, for agricultural research purposes:

Designation	Acres of Land Devoted to Various Uses			
	Area	Cultivation	Pasture	Farmstead, Roadways, and Miscellaneous
TOTAL .....	7,595.895	1,407.6	6,012.095	176.2
Main Station Farm .....	*127	98	11	18
Division of Veterinary Science.....	*141	5	130	6
State Apicultural Research Laboratory, San Antonio, Bexar County.	10	6	1	3
Loin Disease Field Laboratory, Bammel, Harris County.....	**879.4	0	877.4	2
Substation No. 1, Beeville .....	151.5	63.2	84.3	4
2, Troup .....	150	50	90	10
3, Angleton .....	157	51	100	6
4, Beaumont .....	100	60	30	10
5, Temple .....	96	37	55	4
6, Denton .....	209.92	163	34.92	12
7, Spur .....	406.35	104	292.35	10
8, Lubbock .....	160	109	41	10
9, Balmorhea .....	200	68	120	12
10, College Station ..	***901.8	212	674.8	15
11, Nacogdoches ...	82.5	33.4	38.9	10.2
12, Chillicothe .....	100	80	10	10
14, Sonora .....	3,461.63	65	3,376.63	20
15, Weslaco .....	100	95	3	2
†16, Iowa Park .....	161.795	108	41.795	12

\*Included in the main tract of College land.

\*\*Leased land.

\*\*\*Includes 636 acres of the College's main tract and 265.8 acres purchased later for research purposes.

†Formal establishment dates from September 1, 1925.

## COOPERATION

In accordance with the long-established policy of the Texas Station to cooperate wherever cooperation may be mutually desirable, formal agreements providing for cooperative research have been entered into or continued during the year as follows:

1. Office of Forage Crops, Bureau of Plant Industry, United States Department of Agriculture, in the operation of Substation No. 12, Chillicothe, Texas, and in general forage crops investigations throughout the State.
2. Office of Foreign Seed and Plant Introduction, Bureau of Plant Industry, United States Department of Agriculture, for the introduction, propagation, and distribution of newly introduced plants giving promise of becoming valuable in Texas.



3. Office of Cotton and Truck-Disease and Sugar-Plant Investigations, Bureau of Plant Industry, United States Department of Agriculture, for an annual plant disease survey in Texas and for a general study of plant diseases.
4. Bureau of Soils, United States Department of Agriculture, for the conduct of soil survey work in Texas.
5. The Bureau of Entomology, United States Department of Agriculture, for cooperative investigations of insects and parasites affecting livestock.
6. Bureau of Animal Industry, United States Department of Agriculture, for investigations as to the adaptability of Corriedale sheep to Texas conditions and for the study of soft pork problems.
7. Bureau of Agricultural Economics, United States Department of Agriculture, for studies of farmer's and ranchmen's business organizations and in making an agricultural economic survey of a typical crop-farming area in the black-lands of Texas.
8. Freeport Sulphur Company for the study of composting sulphur with different soils.
9. The Barrett Company of Texas, for cooperative investigations in rice improvement and methods of production.
10. School of Agriculture, Agricultural and Mechanical College of Texas, wherein Station men may give lectures to students and teachers may do cooperative investigation work for the Station.
11. School of Veterinary Medicine, Agricultural and Mechanical College of Texas, whereby the Dean of the School of Veterinary Medicine acts as Chief of the Division of Veterinary Science for the Station.
12. School of Engineering, Agricultural and Mechanical College of Texas, wherein certain professors may cooperate with the Station workers in agricultural studies involving engineering problems.
13. Extension Service, Agricultural and Mechanical College of Texas, whereby Extension workers from time to time suggest the more important problems confronting Texas farmers and stockmen and certain Extension specialists cooperate with the Station in making certain investigations mutually agreed upon.
14. Williamson County Belton Cotton Seed Growers Association of Granger, Texas, for the increase and distribution of seed of pure Belton cotton.
15. Texas State Live Stock Sanitary Commission, in studies of the sheep scab mite at the Ranch Experiment Station.
16. Western Weighing and Inspection Bureau of Dallas, wherein the railroads of the State and Southwest furnish a fund for the conduct of research and investigations of the various transit and storage diseases affecting fruits, vegetables, and other field crops.

## PUBLICATIONS

The following is a detailed statement of the eight bulletins, four circulars, one annual report, and one special circular which were printed and distributed during the fiscal year:

Number and Title	Number Copies Printed	Pages	Total Number Pages in Edition
<b>TOTAL</b> .....	<b>241,000</b>	<b>444</b>	<b>5,282,000</b>
<b>Bulletin No.</b>			
255 (Reprint) Beekeeping for Beginners.....	5,000	28	140,000
315 Digestion Experiments with Oat By-Products and Other Feeds, Report No. 7.....	6,000	12	72,000
316 The Soils of Brazos, Ellis, and Washington Counties .....	8,000	88	704,000
317 Comparative Influences of Various Protein Feeds on Laying Hens.....	15,000	24	360,000
318 The Relation Between Rents and Agricultural Land Values in Theory and in Practice....	10,000	71	710,000
319 Field and Laboratory Notes on a Fatal Disease of Cattle Occurring on the Coastal Plains of Texas (Loin Disease) .....	10,000	32	320,000
320 The Influence of Individuality, Age and Season Upon the Weights of Fleeces Produced by Angora Goats under Range Conditions..	10,000	54	540,000
321 Cotton Variety Experiments at the Main Sta- tion, 1912 to 1922 .....	12,000	22	264,000
<b>Circular No.</b>			
31 Standard Fertilizer Formulas and Their Use..	26,000	7	182,000
32 Cotton Boll Weevil Control in Texas.....	40,000	14	560,000
33 Texas Agricultural Experiment Station System	15,000	40	600,000
34 The Lower Rio Grande Valley of Texas.....	10,000	15	150,000
<b>Annual Report:</b>			
Thirty-Fifth Annual Report, 1922.....	4,000	15	60,000
<b>Special Circular: (Without number)</b>			
The Soil Survey—What It Is—Its Uses.....	20,000	16	320,000
Unnumbered Press Bulletin.....	50,000	6	300,000

## Scientific Articles Written

In addition to the regular research bulletins and circulars, members of the staff have written 42 scientific and technical articles upon varying topics, for publication in journals, magazines, and periodicals of interest to scientific workers. These articles are carefully prepared and passed upon by the Director and when released are numbered and included in the regular "Contribution" series of the Station System.

## FINANCIAL STATEMENT

A detailed statement of all funds devoted to the Texas Agricultural Experiment Station System is given in the pages immediately following. The fiscal year for the State appropriations is for the period from September 1, 1923, to August 31, 1924, while the fiscal year for the Federal Hatch and Adams funds is for the period from July 1, 1923, to June 30, 1924, and the financial schedules which follow are based upon these designations.

## FUNDS AVAILABLE

From United States Treasurer for the year ending June 30, 1924, HATCH FUND .....	\$ 15,000.00
From the United States Treasurer for the year ending June 30, 1924, ADAMS FUND .....	15,000.00
From State Treasurer for the year ending August 31, 1924, SUBSTATIONS .....	155,000.00
From State Treasurer for the year ending August 31, 1924, DIVISIONS .....	139,000.00
From Substation Treasury for the year ending August 31, 1924, SUBSTATION TREASURY FUND.....	54,813.33
From Main Station Treasury for year ending August 31, 1924, MAIN STATION TREASURY .....	23,311.10

## FEDERAL FUNDS

HATCH FUND:	Debit	Credit
Received from United States Treasurer.....	\$ 15,000.00	\$
Salaries .....		11,632.88
Labor .....		100.00
Stationery and Office Supplies .....		169.24
Sundry Supplies .....		207.00
Furniture and Fixtures .....		881.27
Scientific Apparatus .....		73.22
Tools, Machinery and Appliances .....		1,215.51
Repairs and Buildings.....		720.88
TOTAL.....	\$ 15,000.00	\$ 15,000.00
ADAMS FUND:	Debit	Credit
Received from United States Treasurer.....	\$ 15,000.00	\$
Salaries .....		13,611.22
Labor .....		601.55
Stationery and Office Supplies .....		16.25
Scientific Apparatus .....		19.35
Feed Stuffs .....		69.63
Sundry Supplies .....		186.76
Traveling Expenses .....		30.32
Heat, Light, and Water.....		38.50
Furniture and Fixtures.....		51.20
Scientific Equipment .....		5.00
Tools, Machinery and Appliances.....		200.37
Repairs and Buildings.....		169.85
TOTAL.....	\$ 15,000.00	\$ 15,000.00



## STATE FUNDS

DIVISION APPROPRIATIONS:	Debit	Credit
Received from State Treasurer.....	\$139,000.00	\$
Agronomy Farm .....		8,000.00
Agronomy Division .....		2,500.00
Entomology .....		12,900.00
Horticulture .....		1,500.00
Veterinary Science .....		7,000.00
Plant Pathology and Physiology.....		1,500.00
Soil Survey .....		7,000.00
Animal Industry .....		5,000.00
Apiculture .....		7,100.00
Farm and Ranch Economics.....		1,600.00
Publications .....		8,000.00
General Expenses .....		8,840.00
Salaries .....		68,060.00
TOTAL.....	\$139,000.00	\$139,000.00

CLASSIFICATION OF EXPENDITURES  
(DIVISION APPR.)

Salaries .....	\$ 74,460.46
Labor .....	7,737.92
Furniture and Fixtures.....	650.64
Office Supplies .....	2,672.03
Freight and Express .....	610.01
Traveling Expenses .....	8,800.12
Repairs and Buildings .....	8,132.96
Seeds and Plants .....	70.38
Fertilizers .....	89.65
Feed Stuffs .....	1,004.63
Foulbrood Expenses .....	9,430.64
Wool Scouring Plant .....	613.65
Loin Disease .....	2,858.67
Scientific Apparatus .....	306.20
Farm, Machinery, and Implements .....	795.23
Small Tools .....	17.40
Livestock .....	6.50
Laboratory Supplies .....	1,153.89
Fuel, Oils, and Greases .....	215.95
Library .....	164.75
Publications .....	5,381.70
Rent on lands .....	463.82
*BALANCE UNEXPENDED (as of August 31, 1924).....	13,272.74
TOTAL.....	\$139,000.00

\*Unexpended balance shown has been requisitioned, but not vouchered as of August 31, 1924.

## STATE FUNDS

SUBSTATION APPROPRIATIONS:	Debit	Credit
Received from State Treasurer.....	\$155,000.00	\$
Beeville .....		5,000.00
Troup .....		4,250.00
Angleton .....		4,250.00
Beaumont .....		7,250.00
Temple .....		4,250.00
Denton .....		5,500.00
Spur .....		12,390.50
Lubbock .....		5,500.00
Balmorhea .....		15,259.50
Feeding and Breeding, College Station.....		7,650.00
Dairy section .....		4,200.00
Poultry section .....		1,500.00
Swine section .....		1,600.00
Nacogdoches .....		4,250.00
Chillicothe .....		3,200.00
Sonora .....		12,500.00
Lower Rio Grande, Weslaco.....		54,650.00
Horticultural Substation, College Station.....		1,800.00
TOTAL.....	\$155,000.00	\$155,000.00

CLASSIFICATION OF EXPENDITURES  
(SUBSTATION APPR.)

Salaries .....	\$ 31,592.50
Labor .....	28,708.39
Furniture and Fixtures .....	103.70
Office Supplies .....	1,283.63
Freight and Express .....	342.53
Traveling Expenses .....	592.40
Buildings, Improvements, and Repairs Thereon.....	23,471.32
Seeds and Plants .....	1,467.25
Fertilizers .....	271.80
Feed Stuffs .....	1,686.01
Scientific Apparatus .....	675.00
Farm, Machinery, and Implements.....	2,609.76
Small Tools .....	200.00
Livestock .....	1,500.00
Laboratory Supplies .....	262.85
Fuel, Oils, and Greases.....	1,245.14
Library .....	123.96
Lands Purchased .....	34,390.50
*BALANCE UNEXPENDED (as of August 31, 1924).....	24,473.26
TOTAL.....	\$155,000.00

\*Unexpended balance shown has been requisitioned, but not vouchered as of August 31, 1924.

## SALES FUNDS

SUBSTATION TREASURY:	Debit	Credit
Received from sale of farm products.....	\$ 54,813.33	\$
Beeville .....		1,436.33
Troup .....		185.45
Angleton .....		448.05
Beaumont .....		541.07
Temple .....		1,474.40
Denton .....		3,577.32
Spur .....		1,628.78
Lubbock .....		2,729.70
Balmorhea .....		3,296.30
Feeding and Breeding, College Station.....		2,807.53
Dairy section .....		8,632.23
Poultry section .....		4,231.07
Swine section .....		2,714.51
Nacogdoches .....		259.48
Chillicothe .....		543.48
Sonora .....		9,368.94
Lower Rio Grande .....		131.00
Wool Scouring Plant .....		5,326.77
Soil Survey .....		5,480.92
TOTAL.....	\$ 54,813.33	\$ 54,813.33

CLASSIFICATION OF EXPENDITURES  
(Substation Treasury)

Salaries .....	\$ 2,225.00
Labor .....	6,900.19
Postage, Stationery and Office Supplies .....	1,757.33
Furniture and Fixtures .....	1,101.73
Freight and Express .....	1,170.19
Feed Stuffs .....	11,636.66
Seeds and Plants .....	628.59
Wool Scouring Plant, (samples only).....	5,124.14
Laboratory Supplies .....	936.71
Farm Machinery and Implements.....	4,501.50
Scientific Apparatus .....	57.98
Fuel, Oils, and Greases .....	2,265.77
Livestock .....	930.28
Repairs and Buildings .....	7,986.53
Traveling Expenses .....	1,796.83
Land Purchased .....	406.00
Notes .....	1,815.25
BALANCE UNEXPENDED (as of August 31, 1924).....	3,572.65
TOTAL.....	\$ 54,813.33



## SALES FUNDS

MAIN STATION TREASURY:	Debit	Credit
Received from Sales .....	\$ 23,311.10	\$
Agronomy Farm .....		2,625.85
Entomology .....		173.80
Plant Breeding .....		18.93
Horticulture .....		88.62
Veterinary Science .....		2,807.28
Plant Pathology and Physiology .....		2,017.84
Photographic Committee .....		1,019.84
Chemical Analyses .....		11,051.11
Sulphur Fund .....		2,500.00
Farm and Ranch Economics .....		150.00
Apiculture .....		711.71
Interest and Discount .....		146.12
TOTAL.....	\$ 23,311.10	\$ 23,311.10

CLASSIFICATION OF EXPENDITURES  
(Main Station Treasury)

Salaries .....	\$ 10,802.89
Labor .....	1,389.95
Postage, Stationery and Office Supplies.....	315.62
Furniture and Fixtures .....	372.74
Freight and Express .....	490.04
Feed Stuffs .....	619.74
Seeds and Plants .....	262.99
Farm, Machinery, and Implements .....	1,925.23
Scientific Apparatus .....	478.94
Library .....	4.00
Livestock .....	1,578.80
Repairs and Buildings .....	669.59
Traveling Expenses .....	196.51
Fuel, Oils, and Greases.....	404.51
Insurance .....	254.80
Notes .....	478.76
BALANCE UNEXPENDED (as of August 31, 1924).....	3,065.99
TOTAL.....	\$ 23,311.10

## FEED CONTROL SERVICE

RECEIPTS:	Debit	Credit
Tax Collected (inspection tax tags).....	\$100,904.74	\$
DISBURSEMENTS:		
Salaries .....		18,105.00
Labor .....		987.33
Postage, Stationery and Office Supplies.....		1,558.74
Freight and Express .....		398.93
Traveling Expenses (Inspectors) .....		8,217.35
Furniture and Fixtures .....		471.23
Tags bought .....		13,614.50
Tag Refunds .....		537.57
Repairs and Buildings .....		850.06
Publications .....		4,081.24
Analyses .....		12,000.00
NET SURPLUS (as of August 31, 1924).....		40,082.79
TOTAL.....	\$100,904.74	\$100,904.74

## SUMMARY WORKING FUND

ACCOUNTS:	Debit	Credit
Loan from A. and M. College.....	\$	\$ 10,000.00
Substation Treasury .....		8,089.02
Main Station Treasury .....		8,160.55
State Warrants in Transit to Austin, Texas.....	5,685.65	
City National Bank, Bryan, Texas.....	2,204.85	
First National Bank, Bryan, Texas.....	2,138.92	
First State Bank and Trust Co., Bryan, Texas.....	693.54	
Cash on Hand in Cash Items.....	11,334.99	
Hatch and Adams Funds .....	4,191.62	
TOTAL.....	\$ 26,249.57	\$ 26,249.57

## INVENTORIES

SUBSTATIONS:	VALUE
Beeville .....	\$ 27,579.85
Troup .....	34,620.34
Angleton .....	20,568.85
Beaumont .....	20,062.73
Temple .....	28,858.83
Denton .....	43,959.86
Spur .....	58,058.65
Lubbock .....	31,491.24
Balmorhea .....	21,310.45
F. and B. Farm (Dairy) (Poultry) (Swine) .....	112,800.95
Nacogdoches .....	23,448.66
Chillicothe .....	23,336.37
Sonora .....	115,545.65
Lower Rio Grande .....	80,563.62
TOTAL .....	\$591,706.05

DIVISIONS:	VALUE
General (Administrative) .....	\$ 40,593.65
Agronomy Farm .....	34,183.35
Agronomy Division .....	7,979.68
Entomology .....	8,602.48
Horticulture .....	6,163.77
Veterinary Science .....	27,882.75
Plant Pathology and Physiology .....	5,361.63
Soil Survey .....	1,109.89
Animal Industry .....	19,277.06
Apiculture .....	13,396.30
Farm and Ranch Economics .....	1,337.90
Chemistry .....	10,228.41
Botany .....	1,867.64
Photographic Committee .....	1,204.40
Feed Control Service .....	2,595.60
TOTAL .....	\$180,784.51

TOTAL VALUE SUBSTATION PROPERTY \$591,706.05

TOTAL VALUE DIVISIONS PROPERTY....\$180,784.51

TOTAL VALUE ALL STATION PROPERTY \$772,490.56

## CLASSIFICATION OF INVENTORIES

Furniture and Fixtures .....	\$ 56,287.24
Postage, Stationery and Office Supplies .....	10,298.50
Land Owned .....	220,681.47
Buildings .....	246,537.92
Fences .....	31,003.75
Scientific Apparatus .....	36,517.21
Chemical and Laboratory Supplies .....	8,026.25
Farm, Machinery, and Implements .....	40,266.29
Harness .....	2,244.66
Small Tools .....	2,647.37
Livestock .....	67,306.45
Feed Stuffs .....	9,735.25
Seeds and Plants .....	950.50
Books and Periodicals .....	11,329.80
Money Crops to Sell .....	9,076.30
Miscellaneous Items .....	19,526.60
TOTAL .....	\$772,490.56



# PUBLICATIONS AVAILABLE

Order by NUMBER

## BULLETINS

- No.
- 128 Cottonseed Meal as a Human Food (Technical)—1910.
- 159 Steer Feeding—1913.
- 162 Composition and Digestibility of the Chloroform Extract of Texas Hays and Fodders (Technical)—1913.
- 163 Digestion Experiments on Men with Cottonseed Meal—1913.
- 165 Ammonia-Soluble Inorganic Soil Colloids—1914.
- 166 Digestion Experiments with Texas Feeding Stuffs—1914.
- 167 Commercial Fertilizers and Their Use—1914.
- 169 The Total Fatty Acids and Other Ether-Soluble Constituents of Feedstuffs—1914.
- 170 Texas Feeding Stuffs; Their Composition and Utilization—1914.
- 171 Losses of Moisture and Plant Food by Percolation—1914.
- 172 Sudan Grass—1915.
- 173 The Composition of the Soils of the Texas Panhandle—1915.
- 174 The Effect of Organic Compounds in Pot Experiments—1915.
- 175 Distribution and Digestibility of the Pentosans of Feeds—1915.
- 178 The Effect of the Additions on Availability of Soil Phosphates—1915.
- 181 Oxidation of Organic Compounds in the Soil—1915.
- 182 Steer Feeding—1912.
- 183 Moisture Relations of Some Texas Soils—1915.
- 184 Cooperative Fertilizer Experiments with Corn—1908-14.
- 185 The Production Co-Efficients of Feeds (Technical)—1916.
- 186 Fattening Lambs—1916.
- 187 Sprays and Spraying—1916.
- 188 Tile Drainage—1916.
- 189 The Composition of Cottonseed Meal and Cottonseed—1916.
- 190 The Effects of Additions on the Availability of Soil Potash and the Perparation of Sugar Humus—1916.
- 191 The Composition of Rice and Its By-Products—1916.
- 192 Soils of Grayson, Lee, McLennan, Titus and Tyler Counties—1916.
- 195 Japanese Sugar Cane as a Forage Crop—1916.
- 196 Digestibility of Sugar, Starches, and Pentosans of Roughages—1916.
- 197 Progress Report, Substation No. 3, Angleton, Texas—1909-14.
- 200 Progress Report, Substation No. 4, Beaumont, Texas—1909-14.
- 201 Peanut Meal and Ground Whole Peanuts for Hogs—1916.
- 203 The Productive Values of Some Texas Feeding Stuffs—1916.
- 204 The Recurring of Milo and some Factors Influencing It. (Technical)—1917.
- 207 Poultry Houses and Poultry Equipment for Texas—1917.
- 208 The Fig in Texas—1917.
- 209 Progress Report, Substation No. 2, Troup, Texas—1909-14.
- 210 Barns for Work Animals—1917.
- 211 Field Experiments with Crown Gall—1913-17.
- 212 The Availability of Phosphoric Acid in Rock Phosphate—1917.
- 213 The Composition of the Soils of South Central Texas—1917.
- 214 Progress Report, Substation No. 1, Beeville, Texas—1910-14.
- 215 Progress Report, Substation No. 5, Temple, Texas—1910-14.
- 218 Progress Report, Substation No. 7, Spur, Texas—1909-14.
- 219 Progress Report, Substation No. 8, Lubbock, Texas—1910-14.
- 221 Progress Report Substation No. 9, Pecos, Texas—1910-14.
- 222 The Composition of Peanuts and Peanut By-Products—1917.
- 224 The Influence of Peanuts and Rice Bran on the Quality of Pork—1918.
- 226 Cooperative Soft Pork Investigations—1918.
- 227 Studies of the Harlequin Bug—1918.
- 228 The Influence of Peanut Meal on the Quality of Pork—1918.
- 229 Experiments at Substation No. 3, Angleton, Texas—1909-16.
- 231 The Beemoth or Waxworm—1918.
- 232 Mineral Requirements of Sheep—1918.
- 236 Grain Sorghum Improvement—1918.
- 240 The Utilization of Yucca for the Maintenance of Cattle—1918.
- 243 The Need of Texas Soils for Lime—1919.
- 244 Composition of the Soils of Archer, Franklin and Harrison Counties—1919.
- 245 Feeding Values of Certain Feeding Stuffs—1919.
- 247 The Chemical Composition of the Cotton Plant—1919.
- 255 Beekeeping for Beginners.
- 258 Report of Experiments at Substation No. 4, Beaumont, Texas—1915-18.
- 259 Nitrification in Texas Soils (Technical)—1920.
- 262 The Searing Iron vs. the Knife for Docking or Detailing Lambs—1920.
- 263 Rations for Fattening Steers—1920.
- 269 Grain Sorghum vs. Corn for Fattening Lambs—1920.
- 270 A Study of the Black and Yellow Molds of Ear Corn—1920.
- 277 Sweet Potato Fertilizer Experiments at Substation No. 2—1921.
- 279 Type and Variability in Kafir (Technical)—1921.
- 282 Composition and Feeding Value of Wheat By-Products—1921.
- 285 Beekeeping for Beginners.
- 292 The Blueweed and Its Eradication.

- 295 Correlation Between External Body Characters and Annual Egg Production in White Leghorn Fowls.  
 296 Grain Sorghum vs. Corn for Fattening Baby Bees—1922.  
 305 Swine Feeding Experiments—1923.  
 307 Texas Root Rot of Cotton and Methods of Its Control—1923.  
 308 The Sweet Potato Weevil—1923.  
 309 I. Fattening Steers on Cottonseed Hulls With and Without Corn.—II. The Influence of Age on Fattening Steers—1923.  
 310 The Interpretation of Correlation Data—1923.  
 311 The Influence of Individuality, Age and Season Upon the Weights of Fleeces Produced by Range Sheep—1923.  
 312 Commercial Fertilizers in 1922-23.  
 325 Effect of Cropping Upon the Active Potash of the Soil.  
 326 Breeding Experiments with Blackberries and Raspberries.  
 313 Rice Bran and Rice Polish for Growing and Fattening Pigs—1923.  
 314 Commercial Feeding Stuffs, Sept. 1, 1922 to Aug. 31, 1923.  
 315 Digestion Experiments with Oat By-Products and other Feeds, Report No. 7—1924.  
 316 The Soils of Brazos, Camp, Ellis and Washington Counties—1924.  
 317 Comparative Influences of Various Protein Feeds on Laying Hens—1914.  
 318 The Relation Between Rents and Agricultural Land Values in Theory and in Practice—1924.  
 319 Field and Laboratory Notes on a Fatal Disease of Cattle Occurring on the Coastal Plains of Texas (Loin Disease)—1914.  
 320 The Influence of Individuality, Age and Season upon the Weights of Fleeces Produced by Angora Goats under Range Conditions—1924.  
 321 Cotton Variety Experiments at the Main Station—1912 to 1922.  
 322 Commercial Fertilizers in 1923 and 1924.  
 323 The Price of Feed Utilities.  
 325 Effect of Cropping Upon the Active Potash of the Soil.  
 326 Breeding Experiments with Blackberries and Raspberries.  
 327 An Agricultural Economic Survey of Rockwall County Texas.  
 329 Energy Production Coefficients of American Feeding Stuffs.  
 330 Farm Mortgage Financing in Texas.  
 332 Biometrical Studies of Lint and Seed Characters in Cotton.  
 333 Heritable Chlorophyll Deficiencies in Seedling Cotton.  
 335 Commercial Fertilizers in 1924-25.

#### CIRCULARS

- 1 Strawberries Under Irrigation in South Texas—1914.  
 7 Insect Enemies of Sudan Grass—1915.  
 10 Housing Farm Implements—1915.  
 22 The Malvaceous Plants of Texas—1920.  
 26 Cost of Production; Its Relation to Price—1920.  
 30 The Practicability of the Milking Machine—1923.  
 31 Standard Fertilizers and Their Use (Reprint)—1923.  
 32 Cotton Boll Weevil Control in Texas—1924.  
 33 Texas Agricultural Experiment Station System—1924.  
 34 The Lower Rio Grande Valley of Texas.  
 35 Suggestions on Queen Rearing.  
 36 Foulbrood Control and Diseases of Bees—Foulbrood Law and Revised Regulations.

#### ANNUAL REPORTS

- 25th for 1912; 26th for 1913; 27th for 1914; 28th for 1915; 29th for 1916; 32nd for 1919; 35th for 1922; and 36th for 1923.

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